THE

AMERICAN REVIEW OF TUBERCULOSIS ABSTRACTS

VOLUME LVIII SEPTEMBER, 1948 ABST. No. 3

Recovery Types in Pulmonary Tuberculosis.—The purpose of this study was to determine clinically and radiologically how and when lung lesions heal in adult tuberculosis. Of 1,244 patients discharged from the preventive rest period required for insured patients in Chile, 405 (236 men and 169 women) who had been under observation one year or longer by the National Employees' Medical Department were taken for consideration. Ages varied from 15 to over 55 years, 88.5 per cent being in the 15–34 year period. The stage of the disease on admission had been minimal in 27.65 per cent, moderately advanced in 56.5 per cent and very advanced in 3.4 per cent. The remaining 12.3 per cent suffered from pleurisy. Radiologically, 39.7 per cent showed at the time of admission unilateral infiltration, 31.1 per cent bilateral processes, 16 per cent both unilateral infiltration and nodes, 3.9 per cent unilateral nodes and in 2 per cent the manifestations were undetermined. Of 307 who had the sputum examined, 58.95 per cent proved positive. About 80 per cent of apparently arrested cases on discharge had had from six to twenty-four months of preventive rest. The types of recovery were: complete resorption, 6.4 per cent; residual pulmonary, pleural or pleuropulmonary (but mostly pulmonary) scars, 93.6 per cent. Calcification was present only in 0.2 per cent. Recurrences occurred in 10.9 per cent in a period varying from three to sixty-six months, but mostly (77.2 per cent) within the first two years following discharge. Recurrences were in the original site in 75 per cent, elsewhere in 20.4 per cent, and in both locations in 4.5 per cent. The desirability of re-examining these patients every two or three months during the first two years after discharge is emphasized.—*Formas de Curación de la tuberculosis pulmonar del adulto, Arturo Rodríguez, Felicindo Mendoza, Mario Zanolli & René Cárdenas, Ap. respir. y tuberc. Santiago, April–June, 1947, 12: 110.*—(*A. A. Moll*)

Reactivation following Recovery in Pulmonary Tuberculosis.—A study of the type of recovery and incidental factors was made in El Peral Sanatorium in Chile in 524 patients who had been discharged from April 15, 1938 to June 30, 1946 in an apparently or actually arrested condition. Both clinical and X-ray examinations were made periodically after discharge. On the completion of the study 358 patients (68.4 per cent) remained under observation. This figure is, however, deceiving, as the length of the follow-up period must vary considerably in such a group, and this will naturally affect the results. The chances of reactivation of the disease average 3.35 per cent per year. Sex, type of the disease (including extent and presence of cavitation) and type of treatment seemed to have but little influence on the probabilities of reactivation, the data not being sufficiently conclusive on any of these points. A thorough follow-up system is most important during the first year following discharge when the rate of patients failing to return for examination is as high as 20 per cent.—*Formas de Curación en la tuberculosis pulmonar en el adulto, Hospital-Sanatorio El Peral (Medical Staff), Ap. respir. y tuberc., Santiago, April–June, 1947, 12: 124.*—(*A. A. Moll*)

Supplementary Aids for Classification of Residual Lesions.—In a group of 68 tuberculosis patients with residual X-ray shadows and occasionally positive sputum, various methods were used to clarify the nature of the lesions present. Tomography disclosed in 12 cases the presence of active pulmonary lesions amenable to treatment. Bronchoschopy revealed in 13 of 40 patients bronchial lesions of a tuberculous nature. Bronchography showed in 30 of 52 parietal changes in the bronchial tubes adjoining the original pulmonary focus. While not definitely tuberculous, the residual pulmonary or tracheobronchial process in 18 of the 68 cases may still conceal small active foci which available examination methods fail to reveal. A residual condition may be properly labeled only after a careful X-ray and tomographic examination. If the sputum or the gastric contents are occasionally positive, the cause may be located through a bronchoscopic or bronchographic or X-ray study.—*El problema del tuberculoso bacilífero con lesiones radiológicas de aspecto residual, Medical Staff of Putaendo Sanatorium (Rapporteur, H. Duran M.), Ap. respir. y tuberc., Santiago, April-June, 1947, 12: 140.*—(*A. A. Moll*)

Hepatic Function in Tuberculosis.—Along with chronic alcoholism, pulmonary tuberculosis is a frequent cause of fatty infiltration of the liver. There is no direct clinical evidence of significant liver damage in patients with chronic pulmonary tuberculosis however. A review of twenty-five years of studies reveals that considerable laboratory evidence of liver function disturbance has been found, but a critical study of these publications shows that the function tests used were nonspecific and obsolete. A subsequent study in which testing was carried out with the two milligram dose of bromsulphalein showed some evidence of hepatic dysfunction. In 1942, by using the more sensitive 5 mg. per kilogram test, Kruger and Gerber found evidence of impaired function, especially in far advanced protracted disease. They examined also a series of 20 patients with secondary amyloid disease and found significant retention of bromsulphalein in 18 patients, in contrast with a previous study showing dye retention in 2 out of 12 patients when the 2 mg. dose was used. The present authors felt that with further improvement in the form of the serial bromsulphalein test, and with the availability of other fairly specific procedures such as the intravenous hippuric acid test, the cholesterol ester determination, the cephalin cholesterol flocculation test and the determination of a series of chemical serum components related to liver function, a satisfactory study could be made. By means of these procedures hepatic dysfunction was demonstrated in a large percentage of cases. The serial bromsulphalein test showed the greatest number of positive results. Outstanding abnormalities were found in 2 patients with complicating smyloidosis.—*Studies of Hepatic Function in Pulmonary Tuberculosis, A. Hurst, H. M. Maier & S. A. Lough, Am. J. M. Sc., October, 1947, 214: 431.*—(*G. F. Mitchell*)

Streptomycin.—This report is based on the findings in 43 cases of pulmonary tuberculosis treated with streptomycin. Thirty six of these, observed for a minimum period of six weeks following completion of therapy, are considered in detail. All patients were on complete bed-rest and none received collapse treatment until at least ninety days following start of drug treatment. In the beginning, 18 patients received 3.0 grams daily in divided doses for 120 days. Subsequently, the period of treatment was shortened to forty-two days. Three patients received one gram daily for forty-two days. There were 18 patients with recent predominantly exudative disease with early cavitation. Nine manifested satisfactory early remissions; all had patchy or confluent pneumonic lesions which apparently had not caseated or excavated extensively. In 2 of the 9, the remission was followed by relapse within two months after completion of drug therapy. Six patients showed considerable improvement without full remission. In 3, with extensive caseation,

a rapidly progressive course followed a short period of improvement. In 7 of the 18, the disease has been apparently controlled for six months without collapse therapy. Five others have had successful collapse treatment; all would have been considered as poor risks prior to improvement under streptomycin. There were 18 patients with predominantly fibrocavernous pulmonary tuberculosis; of these, 3 attained cavity closure and sputum conversion during therapy. Four were rendered suitable for thoracoplasty. In 10, there was some temporary improvement followed by progression of the disease. In several of these, collapse therapy might have been feasible if it had been undertaken at the time of maximal improvement. Within one week of start of therapy, there was evidence of healing of ulcerative lesions of the larynx or bronchi in all 8 patients in which these were present. Healing was usually complete by the end of the second month. Tubercle bacilli could be cultured regularly from 23 patients during and subsequent to therapy. There was a striking correlation between the appearance of *in vitro* resistance and the duration of streptomycin therapy. Resistant bacilli were obtained in all but one of 11 patients who received streptomycin continuously for periods of seventy-five to 120 days. Resistant bacilli were observed in only one of 11 patients who received streptomycin for forty-two days. The majority of drug resistant strains appeared in the third month of treatment. *In vitro* resistance has not been observed to disappear and has persisted in 4 patients from whom bacilli could be cultured regularly a year after the start of drug therapy. In all 7 patients who continued to discharge bacilli during and subsequent to drug treatment, the tuberculous infection became actively progressive following the detection of resistant bacilli. In each case, the disease was thereafter completely uninfluenced by further administration of streptomycin and 4 went on to die. Postmortem studies of 2 patients revealed no unusual findings. Streptomycin therapy appears definitely to be a valuable adjunct in the treatment of pulmonary tuberculosis. In all 43 patients, there was a measurable degree of objective improvement. The best results are to be expected in the early acute exudative types of disease. Healing under streptomycin treatment appears to follow the same course as natural healing. Chemotherapy might be expected to increase the number of apparent cures and possibly to shorten the time required for healing. The lower pH of tuberculous caseous areas may be a factor in diminishing the efficacy of streptomycin in this type of disease. Streptomycin treatment cannot be expected to result in the complete eradication of tubercle bacilli from all foci. There appears to be a definite relationship between *in vitro* and *in vivo* bacterial resistance. The administration of the drug for only forty-two days greatly lowers the incidence of drug fastness. Streptomycin is particularly valuable in increasing the number of patients in whom surgical therapy will be possible. The drug is properly used at present in cases of progressive moderately and far advanced pulmonary tuberculosis of recent origin and of predominantly exudative character. In fibrotic disease, the drug should not be used until timing has been considered in relation to the development of drug fastness and possible future surgery. Short, two-week courses of treatment are recommended for laryngeal and bronchial disease for symptomatic relief. In view of the neurotoxicity of the drug, its use is not advised in minimal disease or more advanced tuberculosis in which the outlook is favorable by conventional methods. Unnecessary use of the drug leading to development of drug fastness renders it useless for occasions when it may be seriously needed.—*Streptomycin in the Treatment of Tuberculosis: II. Pulmonary Tuberculosis, C. Muschenheim, W. McDermott, Susan J. Hadley, Harriet Hull-Smith & Alice Tracy, Ann. Int. Med., December, 1947, 21: 989.*—(*H. R. Nayer*)

Streptomycin in Hematogenous Pulmonary Tuberculosis.—All other usual methods of treatment having failed, it was decided to try

streptomycin in a case, practically hopeless, of hematogenous pulmonary tuberculosis in a woman 32 years old. Both the sulfate and the hydrochloride salts were used as available, the average daily dose being 1.5 g. in six portions of 250,000 units each. Tolerance was perfect, with the exception of a slight local tenderness in the injection site, more marked with the hydrochloride. No acoustic manifestations developed. Bacteriological, clinical and radiological results were truly amazing in a 3-month period, with restored appetite, an 18 pound increase in weight, decreased sputum and improved breathing. The streptomycin treatment had to be discontinued then for reasons beyond control. The benefit obtained in this case dating back six years was so outstanding as to justify a trial of the drug in all cases of tuberculosis where other methods fail or cannot be applied. —*Estreptomicina, con particular referencia a su aplicación an la tuberculosis pulmonar hematógena, P. A. Tapella, Prensa méd. argent., August 1, 1947, 34: 1419.*—(*A. A. Moll*)

Streptomycin and Sulphetrone in Tuberculosis.—In experimental studies, sulphetrone was found to be slightly more efficient than diasone or promine in controlling tuberculosis· no acute or chronic toxic effects were noted. It was decided to conduct studies on human beings using streptomycin alone and in combination with sulphetrone. Streptomycin was administered intramuscularly in doses of 0.2 to 0.4 g. every four hours. The daily dose of sulphetrone was 6 to 9 g., given orally; fluids were restricted to one and a half quarts daily. A total of 17 cases was treated, representing a variety of tuberculous lesions. Good results were obtained in one case of tuberculous meningitis, in which 2 mg. of heparin were also given intrathecally; in 4 other cases, where heparin was not used, streptomycin was ineffectual. Temporary improvement was obtained in cases of acute miliary tuberculosis, but later there were recurrences with fatal outcome. Two types of reaction were noted at necropsy in these cases. The first represented healed tubercles in which no bacteria could be detected. The second consisted of young active tubercles showing no signs of repair and containing enormous numbers of acid-fast bacilli; these were probably the result of more recent dissemination. No beneficial effects were noted in chronic fibrocaseous pulmonary tuberculosis. The authors believe that streptomycin is contraindicated in these cases. Although there were too few cases, it was thought that the combination of streptomycin and sulphetrone gave better results than the former drug alone.—*Treatment of Tuberculosis with Streptomycin and Sulphetrone, D. G. Madigan, P. N. Swift & G. Brownlee, Lancet, December 20, 1947, 2: 897.*—(*A. G. Cohen*)

Pneumothorax in Tuberculosis.—In 1943, there was a long list of patients awaiting hospital treatment for tuberculosis. Many were suitable for pneumothorax. Accordingly, a new plan was tried. Patients were admitted for induction of pneumothorax. After the first two refills the patients were sent home and further treatment was given in the out-patient department unless there were complications. The records of the first 150 cases were reviewed. The observation periods ranged from twenty to thirty-three months. The results were considered successful in 82 cases, doubtful in 5 and unsuccessful in 63. In the entire series, 36.7 per cent of the patients became sputum free or negative. The fact that a project of this sort must be conducted by experienced physicians is emphasized.—*Artificial Pneumothorax, A. Maclean & J. S. Gemmill, Lancet, January 31, 1948, 1: 173.*—(*A. G. Cohen*)

Collapse Therpay of Tuberculous Patients with Bronchial Asthma.—Therapeutic pneumothorax is compatible with bronchial asthma if the latter can be controlled medically, and if pulmonary and cardiovascular function are at least fair. Four cases were successfully treated. Sojourn at high altitude where the air contains fewer allergens may have helped in these cases. Two other

tuberculous patients with bronchial asthma were treated with seven- and eight-rib thoracoplasty, and withstood the procedure well.—*Zur Kollapsbehandlung Lungentuberkuloser Asthmatiker, W. Zeun, Schweiz. Ztschr. f. Tuberk., 1947, 4: 169.*—(*B. Gerstl*)

Extraperiosteal Pneumothorax.—This preliminary report concerns the first 6 cases of extraperiosteal pneumothorax. The indications for this type of procedure are seen in extensive bilateral involvement where the poor general condition precludes thoracoplasty and where the dimension and superficial location of the cavity render extrapleural pneumothorax very risky. Extraperiosteal pneumothorax obviates the opening of lymphatics and blood vessels, which are usually in a state of dilatation due to peripleuritis between parietal pleura and endothoracic fascia. After resection of a portion of the fourth rib the internal periosteum of the neighboring ribs is liberated in its entire extent, the internal intercostal muscles are pushed inward and a pocket is formed. The internal wall is composed of the fused visceral and parietal pleurae covered by the endothoracic fascia, periosteum and internal intercostal muscles. The external wall consists of the internal surface of the ribs and external intercostals. Before closure the periost is treated with formol. None of the cases showed subsequent infection of the pocket during the period of observation (which is only two to three months). In all cases a favorable effect on the cavities is reported (disappearance or considerable diminution in size). It is admitted that the postoperative follow-up is too short to permit further conclusions.—*Le pneumothorax extrapériosté, premiers cas et perspectives d'avenir, L. Meyer & J. de Rougemont (présentés par M. Bariety), Rev. de la tuberc., 1947, 11: 380.*—(*V. Leites*)

Effusion Complicating Pneumothorax.—During the last three years, in the Sanatorium El Peral in Santiago, Chile, there were observed 110 cases of serous exudate as a complication of artificial pneumothorax. The unnamed authors follow a classification, in which they distinguish between (*1*) serous or sero-fibrinous, (2) purulent or seropurulent and (*3*) mixed purulent exudates. This somewhat arbitrary distinction has been found of great value for determining the therapeutic procedures to be followed. These have to be based on the microscopic aspects of the fluid and on the state of the underlying pulmonary lesion. In all cases of frank empyema the lung has to be expanded actively, rapidly and at once, regardless of the character of the parenchymal lesion. In addition, in mixed exudates, pleural lavages with antibiotics are given. In serous exudates, the treatment depends upon whether the pneumothorax is considered efficient for the treatment of the disease. Of the 110 cases with serous exudate studied, 61 were treated for an average of 3.1 months with lavages of physiological saline weekly or bi-weekly. The ultimate object was to cure the pleural complication and to preserve the pulmonary collapse. In 4 (6.5 per cent) cases a cure was so obtained. All other cases did not benefit from the treatment: 17 (27.9 per cent) for progressive symphysis, 22 (36.1 per cent) for persistent effusion, and 18 (29.5 per cent) for development of empyema. The therapy was then discontinued and active reëxpansion of the lung was started. Where empyema developed, it did so in an average of 2.4 months from the beginning of the treatment for the exudate. In 21 of the 22 cases with chronic serous effusion the pulmonary expansion with consequent cure of the pleural complications was obtained in an average of 3.5 months, whereas in the group with purulent effusion (18) only 7 responded with a complete reëxpansion. In 11 cases the expansion was partial only, and chronic encapsulated empyema persisted; 49 cases were treated with immediate reëxpansion, as the collapse of the lung was inadequate. Of these, 21 developed a frank empyema, in 10 of which the lung reëxpanded completely in an average of 5.5 months. The remaining 11 reexpanded partially only. Of the 28 serous exudates, 25 responded with total reëxpansion

after 3.1 months of treatment; 3 did not re-expand. In both groups there was practically no difference in the final results. The average time required for reëxpansion was much less in the serous than in the purulent cases. Furthermore, there is no significant difference between the transformation of serous fluid into empyema in the group with immediate active reëxpansion (42.8 per cent) and the group in which maintenance of pneumothorax for therapeutic reasons was attempted (29.5 per cent). The repeated small traumas by aspiration and lavage, then, cannot be the cause for the empyema. There were 106 exudates examined for acid-fast bacilli; 402 by direct smear, 370 by culture, and 24 by animal inoculation. In 54 (50.9 per cent) tubercle bacilli were found. Of these, 40 fluids were found positive only after more than four examinations. An empyema ensued three times as often in those with tubercle bacilli in the fluid as in those without.—*Algunos aspectos de la evolucion de los exudados serosos que complican el neumotorax terapeutico, Bol. d. Hosp.-San. "El Peral," April–October, 1946, 6: 17.*—(*W. Swienty*)

Clicking Pneumothorax.—In some patients with a left pneumothorax, a clicking sound may be heard which is synchronous with the heart beat and is often audible at a distance from the patient; the author describes 2 cases in which this phenomenon was noted. In both cases, the sound persisted for many months after the pneumothorax had become well established; eventually it disappeared. Various theories of origin are discussed. The author believes that the sound is produced by the lingula being flipped against the anterior chest wall by the cardiac impulse. The sound was produced in this manner in a cadaver.—*Clicking Pneumothorax, W. Fox, Lancet, February 7, 1948, 1: 210.*—(*A. G. Cohen*)

Artificial Pneumoperitoneum.—One hour after induction of pneumoperitoneum for tuberculosis, the patient developed pain in the left groin. The scrotum soon became swollen with air. This subsided in nine days, after which refills were continued. It is believed that the cause was a traumatic opening of an anomalous processus vaginalis.—*Scrotal Pneumocele as a Transient Complication of Artificial Pneumoperitoneum, W. N. Rogers & J. V. Garrett, Brit. J. Tuberc., July, 1947, 41: 70.*—(*A. G. Cohen*)

Pulmonary Congestion and Distensibility.—The effect of pulmonary congestion on the distensibility of the lungs was investigated in both the isolated lung of the dog and in the open-chest animal. The degree of distensibility was derived from the corresponding increases in intratracheal pressure produced by inflation of the lung with known volumes of air and, in the isolated lung, also from changes produced by lung inflation upon the ratio of intratracheal to "intrathoracic" pressures (the latter being the pressure in the chamber in which the lung was enclosed). In the isolated lung, injections of known volumes of heparinized blood into the pulmonary artery resulted in a diminished distensibility of the lung. Withdrawal of this blood caused a return of the distensibility toward its control level, thus demonstrating that the decreased distensibility was due to intravascular blood rather than intraälveolar transudate. In the open-chest dog, compression of the pulmonary veins, producing pulmonary congestion, also resulted in a decrease in distensibility of the lung. Release of the compression caused a return of the distensibility toward its control level. Aortic compression, another method for producing pulmonary congestion, also diminished pulmonary distensibility. Improvement in pulmonary distensibility occurred after compression of the main pulmonary artery, after partial compression of both venae cavae, and during the development of shock toward the end of the experiment. This study demonstrated that the distensibility of the lungs varied in an inverse manner with the amount of blood in the pulmonary vessels. (Authors' summary.)—*The Effect of Pulmonary Vascular Congestion on the Distensibility of the Lungs,*

I. Mack, M. Grossman & L. N. Katz, Am. J. Physiol., October, 1947, 150: 654.—(G. C. Leiner)

Dissociated Paralysis of Diaphragm.—Four months after a second right phrenic crush, supplemented by pneumoperitoneum, it was found that the anterior and mid-portions of the hemidiaphragm remained paralyzed and showed slight paradoxical motion; the lateral and posterior portions, however, had regained full function. At operation, no accessory fibers had been noted. The author believes that in this case, the fibers in the phrenic nerve were so arranged that one part was more thoroughly crushed than the other. This phenomenon has therapeutic implications. Since most tuberculous lesions are posterior, premature resumption of function of this position of the hemidiaphragm could have unfavorable consequences.—*Dissociated Paralysis of Diaphragm following Phrenic Crush and Pneumoperitoneum, W. Fox, Thorax, March, 1948, 3: 15.—(A. G. Cohen)*

Pulmonary Emphysema.—Pulmonary emphysema is a functional disease of the lungs in which there is marked interference with the diffusion of oxygen and carbon dioxide. When impairment in this function may be substantiated with symptoms and X-ray evidence of pulmonary emphysema, a definite diagnosis can be made. Without demonstration of impairment in diffusion of oxygen and carbon dioxide despite dyspnea and/or roentgenographic evidence of overdistention of the lungs, emphysema may only be conjectured. Symptoms of dyspnea may occur with normal lungs when ventilation is reduced. Similarly, overdistention of pulmonary segments, which may reduce ventilation, does not necessarily impair the interchange of gases. Bullae and blebs result from overdistention of alveoli near the pleural surface of the lung and may exist in otherwise normal lungs. Emphysema is not a necessary accompaniment of such phenomena. Overdistention of the lungs does not always bring about a loss of diffusion function; in fact, there is little exact knowledge concerning what actually happens in lung tissues which causes impairment of its ability to diffuse oxygen and carbon dioxide. It is not known where emphysema is a primary or secondary disease. Nineteen case histories are given to illustrate the foregoing conclusions.—*A New Approach to the Understanding of Pulmonary Emphysema: A Method of Determining Emphysema of the Lungs, G. G. Ornstein, Quart. Bull. Sea View Hosp., April, 1947, 9: 89.—(P. Q. Edwards)*

Intrathoracic and Venous Pressures.—Intrathoracic pressures are usually recorded from air pockets, the values depending on the amount of admitted air. Intrathoracic pressures can be recorded by calibrated optical capsules through air systems with the introduction of only insignificant quantities of air. Anesthetized dogs were used for these experiments. The following conclusions were reached: "Records of intrapleural pressure from the upper regions of the left side and lower regions of the right side of the thorax consist of smooth curves of subatmospheric pressure which decrease further during inspiration. Changes in these pressures are occasioned by modifications in tonus and contraction of respiratory muscles, blood content of the chest, and elasticity of lung tissue. Records from artificial pockets around the right heart and in the left lower pleural spaces adjacent to the apex of the heart show superposition of conspicuous cardiac variations on respiratory variations. It is suggested that these superadded variations rather than distortion of lung tissue by the heart and mediastinum are responsible for the existence of somewhat higher pressures around the heart than in the pleural cavities. In order to compare variable pressures around the heart with constant pressures found in some pleural leads special methods for comparison were devised. Of several methods tried, the comparison of instantaneous pressures at the end of a selected diastole, or so-called Z pressure, is an adequate and simple procedure which is easily related

to atrial pressures as well. Comparison of such Z pressures in various intrathoracic regions reveals that pressures recorded from the right lower thoracic cavity are only about 10 mm. H_2O higher than those derived around the right heart and change directionally with them. Since it remains a moot question as to which of these more closely approximates the true intrathoracic component, such records may certainly be used in calculating trends of effective venous pressure. The error involved is no greater than exists in most of our biological data. Intrathoracic pressures recorded from the upper regions of the chest, from the whole left side or regions above the diaphragm and from the mediastinum, are unreliable for one reason or another."—*Regional Intrathoracic Pressures and Their Bearing on Calculation of Effective Venous Pressures, C. J. Wiggers, M. N. Levy, & G. Graham, Am. J. Physiol., November, 1947, 151: 1.*—(*G. C. Leiner*)

Blood Gases and Bronchial Asthma.—The effect of a broncholytic spray ("Aleudrin," 1 per cent) has been tested by means of determination of arterial blood gases. Fifteen adult asthmatic patients were observed, 7 of them on two different occasions. The following measurements were obtained: vital capacity, arterial oxygen saturation, carbon dioxide content, carbon dioxide tension, blood pH, and alkali reserve. These figures were computed both before and after administration of the drug by nebulizer over a two-minute period. It was found that most patients initially showed a low vital capacity combined with undersaturation of oxygen. Whenever the spray treatment was successful in increasing the vital capacity significantly, increase in the oxygen saturation towards normal was observed. With regard to the carbon dioxide content, four different types of figures were encountered. One group showed lowered carbon dioxide content with lowered oxygen saturation, and one group showed nearly normal oxygen saturation with low carbon dioxide content. In both groups the alkali reserve was nearly normal. The lowered carbon dioxide content was due to hyperventilation in an effort to obtain better oxygen saturation. Treatment in these two groups raised the carbon dioxide level and the pH was slightly lowered. The third and fourth groups of patients demonstrated various degrees of compensated forms of acidosis. In the third group the oxygen tension was somewhat reduced, but the carbon dioxide tension was normal or somewhat raised. Treatment raised the oxygen tension, lowered the carbon dioxide tension, and raised the pH slightly. The fourth group showed considerable retention of carbon dioxide with markedly increased alkali reserve, diminished oxygen tension, and a nearly normal pH. Although this form of acidosis was still compensated, treatment was not successful in materially influencing the blood gas situation, although oxygen saturation increased somewhat. Presumably the situation in the lung was sufficiently pronounced and chronic so that not much benefit could be expected from antispasmodic treatment.—*Der O_2 -und CO_2—Gehalt des arteriellen Blutes bei Asthma bronchiale und seine Beeiflussung durch eine broncholytische Spray, F. Verzar & W. Voegtli, Schweiz. med. Wchnschr., September 13, 1947, 77: 980.*—(*H. Marcus*)

Nitrogen in Blood.—The nitrogen content of arterial and venous blood was determined in dogs during inhalation of 99.6 per cent oxygen; the results were the same when the dogs were breathing a mixture of 5 per cent CO_2 and 95 per cent O_2. The mean values at 0, 10, 20, 30, 40, 60, 180, 240, 300 and 360 minutes, respectively, were for arterial blood: 1.11, 0.28, 0.25, 0.22, 0.21, 0.21, 0.19, 0.16, 0.14, 0.12 volumes per cent; for venous blood, 1.12, 0.45, 0.39, 0.34, 0.31, 0.27, 0.24, 0.20, 0.19, 0.15.—*Nitrogen Content of Femoral Arterial and Venous Blood in Anesthesized Dogs Denitrogenated by Continuous Inhalation of 99.6 per cent Oxygen, L. Karel & R. E. Weston, Am. J. Physiol., November, 1947, 151: 71.*—(*G. C. Leiner*)

Cough as Symptom.—Cough is dependent upon a local stimulus which originates nerve

reflexes through the medulla. The act of coughing can be divided into three phases: (*1*) the inspiratory phase, followed by (*2*) the compressive phase which depends upon the closure of the glottis and an increase in the intrapulmonary pressure, immediately preceding expiration, and (*3*) the expiratory phase, when the vocal cords and ventricular bands are quickly separated and air is forced out with the production of characteristic cough sounds. Purpose of cough is the removal of mucus, inflammatory exudate, and any other material in the air passages. The rôle played by bronchial movements during respiration is extremely important in the removal of secretions from the air passages. Deep inspiration increases the motion of the bronchial walls and this tends to move bronchial secretions. The degree of mobility is practically negligible during quiet respiration, such as is observed in narcosis, acute pleurisy, and injuries to the chest. Ciliary function is also important in the elimination of secretions from the air passages. It is more effective in the presence of thin than in thick secretions. Cough is a symptom, and the cause must be determined. This may be common respiratory tract disease, smoking, exposure to dust and fumes, extrarespiratory causes ("ear cough" or "reflex aural cough"), diseases of the nose and nasal accessory sinuses, nasal or pharyngeal obstruction, aspiration of food or fluid, and allergy. Cough of functional origin occurs, but one must be careful to exclude all possible organic causes before arriving at this diagnosis. To determine the exact cause of cough, careful history and physical examination are necessary. Examination of the ear, nose and throat, and chest, plus chest X-rays are usually indicated. Bronchography is indicated if there is any suspicion of increased bronchopulmonary markings suggesting bronchiectasis. In the presence of a history of allergy, appropriate tests must be performed. Treatment must be directed at the cause of cough. Cough is necessary to rid the tracheal bronchial tree of excessive secretions, for example, in pulmonary abscess or bronchiectasis, and, in these, narcotics should be used sparingly, if at all. On the other hand, in carcinoma, cough is quite purposeless, and therefore symptomatic therapy and suppression of cough may be indicated. When cough is inadequate due to thick tenacious secretions, so-called stimulating expectorants are recommended. Inhalations of carbon dioxide and oxygen increase the quantity of sputum and have been highly recommended.—*Cough as a Symptom, L. H. Clerf, M. Clin. North America, November, 1947, 31: 1393.*—(*L. Hyde*)

Thoracoplasty Survey.—The results of 308 cases of thoracoplasty for tuberculous disease of the lung over a five-year period have been subjected to study. Best results have been obtained with unilateral involvement where the cavities were smallest and in the two age groups of 18 to 25 and 40 to 45. The majority of deaths was due to progression of the disease three weeks to one year postoperatively. The immediate mortality was 5.1 per cent within the first three days; the total mortality was 24.6 per cent, or 76 cases out of 308, corresponding to 11.0 per cent of a total of 668 operations. Worst results occurred in the group where pneumothorax had been tried and was complicated by a pleural effusion. The highest incidence of mortality remains in the group of contralateral pneumothorax patients. Concerning cavity size in relation to results, best results were obtained in the cases with the smallest cavities. In the 308 cases, 255 (82.7 per cent) were unilateral, of which 133 (50.9 per cent) were discharged as arrested, 32 (12.2 per cent) were improved, 28 (11.9 per cent) were unimproved, 6 (2.3 per cent) became worse and 56 (21.8 per cent) died. In the group of 53 patients with bilateral disease, 26 (49.0 per cent) were arrested, 4 (7.5 per cent) improved, 3 (5.6 per cent) became worse and 20 (37.7 per cent) died.—*Survey of Thoracoplasties at Sea View Hospital Over a 5-Year Period (1937–1942), B. Krynski, Quart. Bull. Sea View Hosp., April, 1947, 9: 144.*—(*P. Q. Edwards*)

Thoracoplasty.—All thoracoplasty cases from 1935 to 1946 were reviewed. These was

performed in various institutions and by different surgeons. A total of 633 cases were studied. Forty-five (7.1 per cent) could not be traced. Death occurred within four months in 17 (2.7 per cent) and later in 45 (8.7 per cent). Present fitness for work was found to be: full in 375 (59.2 per cent), light in 35 (5.5 per cent), unfit in 53 (8.4 per cent) and not recorded in 53 (8.4 per cent). No cases of tuberculous empyema are included. The usual cause of early death was atelectasis on the operated side followed by spread to the other side. Hemoptysis was noted occasionally. Later deaths were usually due to exacerbation of disease in the remainder of the lung or in the other lung or to nonrelated causes. The mortality to a large extent depends upon the type of cases selected. Most patients considered doing full work have light jobs. Sputum reports are available in 457 cases. Of these, 73 (16 per cent) remained positive. Cases with persistently positive sputum are not considered failures; bronchiectasis is a frequent source of bacilli. It is often difficult to determine cavity closure, even with the use of planigraphy. Nevertheless, cavities appeared to be closed in 91 per cent.—*The Results of Thoracoplasty in Pulmonary Tuberculosis, T. H. Sellors, Thorax, December, 1946, 2: 216.*—(*A. G. Cohen*)

Treatment of Postpleuritic Tuberculosis.—Cases of tertiary tuberculosis, including those without demonstrable cavity and others with cavities but with negative sputum, were subjected to apical thoracoplasty where inaccessible to pneumothorax. Four to five ribs were resected in one stage under local anasthesia. The results were superior to those obtained with conservative treatment.—*Behandlung der Diskreten, Fruhtertiaren, Postpleuritsichen Lungenspitzentuberkulose Durch Fruhzeitige Spitzenplastik, W. Froehlich, G. deRham & S. Steil, Schweiz. Ztschr. f. Tuberk., 1947, 4: 125.*—(*B. Gerstl*)

Scapulectomy and Thoracoplasty.—In order to prevent the development of extrapleural space infection following thoracoplasty, resection of one-half of the scapula is recommended. This should be done before the rib resection; it gives a better operative exposure, makes retraction of the scapula much easier and most of the trapezius and rhomboid muscles can be spared. Also, in case of very localized apical lesions, a one-stage thoracoplasty may then suffice; the upper three ribs are removed and enough of the fourth and fifth to allow for bedding in of the remainder of the scapula. With this technique, no patients developed extrapleural space infections. Once the space has become infected, scapulectomy is difficult to perform and does not produce the desired results.—*Scapulectomy and Thoracoplasty, A. J. Coello, Brit. J. Tuberc., October, 1947, 41: 75.*—(*A. G. Cohen*)

Resection in Pulmonary Tuberculosis.—Twenty-nine cases of pulmonary resection for tuberculosis during the past five years have been reported from the Mayo Clinic. Indication for resection was bronchostenosis in almost half of the patients. All patients were either those in whom the usual collapse measures had failed or whose lesions were not likely to respond satisfactorily to various surgical collapse measures. The immediate surgical mortality rates were low: 2 deaths in 15 pneumonectomy cases, none in 14 lobectomy cases. Late deaths from extensive spread were one each in the 2 types of resection. The use of streptomycin in the immediate preoperative and early postoperative periods to protect against spread has been encouraging. Development of streptomycin resistance imposes a serious limitation in the usefulness of the drug in controlling late spreads. Nineteen of the 29 patients reported in this series are clinically well with negative sputum, 4 are dead and 5 have active lesions. One patient is untraced. Ulceration in the bronchial stump is not a serious complication. This has occurred in 3 patients with preëxisting bronchial tuberculosis and in each case was responsible for positive sputum postoperatively. In 2 cases the ulceration responded promptly to local treatment with silver nitrate or intramuscular streptomycin and in the

third it has been kept intermittently active for a year by a silk suture in the bronchus. In view of the poor results that are anticipated with thoracoplasty in these patients, the results of this series seem to justify the conclusion that resection has an important place in the treatment of pulmonary tuberculosis.—*Resection in Pulmonary Tuberculosis, O. T. Clagett & W. D. Seybold, Proc. Staff Meet., Mayo Clin., February 18, 1948, 23: 81.*—(*P. Q. Edwards*)

Calcified Pulmonary Foci.—A total of 1,476 children were examined. Of these, 1,050 were contact cases and 426 were examined because of symptoms. The examination consisted of a patch test followed, if negative, by an intracutaneous test. X-rays were taken in 1,100 cases. Calcifications were seen in 105, of which 18 were in the lung, 21 in the lymph-nodes and 66 in both. The right lung was involved twice as often as the left. Only one had a negative intracutaneous test. No children under 2 years of age showed calcification; there was a progressive increase in incidence above that age. The contact children showed a higher percentage of calcification than the noncontacts. It was concluded that intrathoracic calcification in the population studied indicates *per se* a past tuberculous infection.—*Calcified Foci within the Thorax of English Children, B. C. Thompson, Thorax, March, 1948, 3: 43.*—(*A. G. Cohen*)

Bronchial Tuberculosis.—Bronchoscopy has contributed definite and useful data to our knowledge of tuberculosis of the bronchial tree. According to Derscheid and Touissaint, it spreads principally by way of the submucous lymphatics. We know now that tracheobronchial tuberculosis may be primary or secondary. The former is rarely accompanied by active pulmonary lesions. The latter, according to most statistics, complicates pulmonary tuberculosis in 10 to 30 per cent of cases. The lesions most commonly found, in order of their development, are: (*1*) submucous infiltration with thickening, hyperemia and granular aspect of the mucosa; (*2*) ulceration; (*3*) cicatricial stenosis or fibrosis. All three types of lesion are, in most cases, found only by the bronchoscope. The existence of bronchial tuberculosis may be suspected from the presence of "wheezing," of sonorous râles or of laryngeal crepitations. They suggest narrowing of the respiratory passages. The presence of tubercle bacilli in rather abundant sputum with absence of pulmonary lesions as indicated by auscultation and X-ray examination suggests bronchial tuberculosis. Hypoventilation of the lungs, more or less tempoary, may be due to atelectases of greater or less extent from plugging of narrowed bronchial tubes by thickened mucopurulent secretion. Febrile episodes, without apparent cause, sometimes have their origin in bronchial lesions. The author reports three cases in some detail. The first was a typical example of primary bronchial tuberculosis which was quite extensive while the pulmonary lesions were limited. The bronchial lesions became cicatrised but did not entirely prevent the passage of air. The general state of the patient improved after large doses of vitamins A and D were given. The prognosis in this case was considered questionable. In the second case the bronchial lesions were secondary to extensive pulmonary disease. The right lung had become completely atelectatic. Pain behind the sternum in this case was relieved to some extent by pneumothorax on the left side. No attempt was made to dilate the constricted right bronchus by bougies, a procedure which the author considers unsafe and ineffectual. The third case was at first mistaken for one of asthma, and was not recognized as tuberculous for two years. In the mean time parenchymal involvement had occurred. The stage of cicatrization of the bronchial lesions had already been reached. In conclusion the author states that the prognosis of bronchial tuberculosis is always questionable and depends on two factors: first, the degree of evolution of the bronchial lesion which in certain cases is progressive toward a fatal outcome, and secondly, the amount of healing of cicatricial

stenosis that has occurred. The presence of bronchial tuberculosis always makes decision as to the advisability of collapse therapy somewhat difficult. It is contraindicated in primary bronchial tuberculosis as it renders the probability of complete stenosis more certain. If ulcerative parenchymal lesions dominate the clinical picture it may be used, but with less prospect of success than if the bronchi were not involved. The results of local treatment of bronchial lesions with adrenalin, nitrate of silver or electric coagulation have, in the author's experience, not been entirely convincing.—*La tuberculose bronchique, A. Gyselen, Rev. belge de la tuberc., No. 3, 1947, 38: 208.*—(*A. T. Laird*)